9/12/84

Data Evaluation Record

1. Chemical: Naled

2. Test Material: Dibrom 14 Concentrate plus Heavy Aromatic Naptha.

3. Study Identification: Dean, H.J. and J.R. Colquhoun. January 1977. "Effects of Naled (Dibrom-14 on Non-Target Organisms in the Horseheads Swamp Area of Catherine Creek." Prepared by State of New York Department of Health. Submitted to Chevron Chemical Co. EPA Accession No. 253450. Reference No. 18.

4. Study Type: Field Study (Aquatic organisms)

5. Review By: Elizabeth E. Zucker
Wildlife Biologist
EEB/HED
Date: September 12, 1984
Review Time: 5 hours

6. Reported Conclusions:

No evidence of a direct effect of 2 applications of the pesticide was found on caged fish. Ephemeroptera biomass and standing crop, diptera biomass and total biomass and standing crop appeared to be reduced by the first treatment and unaffected by the second treatment.

7. Reviewer's Conclusion

This study may not be used to fulfill a guidelines requirement for an aquatic field study using naled. This is because sample sizes were too small, residue monitoring was not performed, sampling of water and sediment characteristics was infrequent. Also control fish disappeared the day after the second application.

Materials/Methods

Test Procedures

Horsehead Swamp was sprayed on July 15th, 1977 at 8:50 pm at a rate of one ounce Dibrom 14 concentrate plus 15 oz heavy aromatic naptha (0.1 lbs active per acre). Caged fish, seined from the creek were placed at three locations in the study site. Fish were observed daily until July 19th. At on location, drift samples were also taken prior to spraying and 5 times after treatment. A standard square foot sampler which monitored about 1/8 the total stream flow was utilized. Square foot bottom sampling was also performed to determine pesticide effects. Control samples were taken from an unsprayed area of the same stream. Pre-spray samples were collected July 12th and postspray samples taken July 19th from the same areas. The treated area was one of the sites where there were caged fish.

A second application of the pesticide was made the evening August 24th. Again, fish were seined from the creek and caged at the 3 same sites. Fish were observed before the 8:00 pm spraying and daily until August 27th. Drift sampling was not repeated. For the square foot bottom sampling, the control site was moved to 0.5 miles upstream from the original control site. Samples were taken from the original treatment areas. Pre-spray samples were taken on August 24 and post-treatment samples taken August 27. Organisms were identified to family, then counted and weighed.

Statistical Analysis

A T-test was utilized to determine if differences in standing crop biomass between samples. Effects from each treatment was determined separately. The % reduction was calculated according to Mulla et al. (1977) which determines the response due to treatment, and accounts for normal population or biomass change.

Results/Discussion

1. First Application

Trout at one of the treatment sites (Site 2) were all dead prior to application of the pesticide. The authors attribute this to low D.O. found in the area. On the day following treatment, the fish at all three sites were alive with the exception of some black nosed and long nosed dace found dead at the Site 2. On July 19th, one dead trout was found at the control site (Site 1) and the remaining seven fish were released. Eleven fish in the second treatment group at Site 3 were released. At Site 2, there were 2 dead Johnny darters and 8 dead dace on July 9th. The authors atribute these deaths to low D.O. in the area.

Prior to treatment 1.3 organisms per minute were found in the drift sampling, with 1.23 per minute in the post-treatment samples. More forms were represented in the post-treatment draft.

The following conclusions were made concerning benthic organisms:

1. Total Ephemeroptera biomass was reduced by 86%.
2. Total Ephemeroptera standing crop was reduced by 79%.

3. Total Diptera biomass was reduced by 92%.
4. Total biomass of benthic organisms was reduced by 75% and total standing crop was reduced 63%. These reductions reflect the loss of Diptera and Ephemeroptera.

2. Second Application

One day after treatment all fish were alive. By August 25th, the control cage and fish were gone (removed). On August 27th, at Station 2, all fish were alive except one killifish. All fish were alive at Station 3.

Concerning benthic organisms, Ephemeroptera biomass and standing crop, diptera biomass and total biomass and standing crop were unaffected by the second treatment.

The authors suggest that colder water temperatures may have inhibited the breakdown of the chemical producing higher mortality of benthic organisms. However, populations were recovered by the time of the second treatment.

Reviewers Evaluation

A. Test Procedures

The text of this report was confusing and methods were inadequately discussed. Other notable deviations from acceptable field testing protocols include:

1. Sample sizes of exposed fish were too small.
2. Site descriptions were inadequate.
3. Residues monitoring for naled was not performed.
4. Sampling of water and sediments was infrequent.
5. Control fish disappeared following second treatment.
6. Low levels of dissolved oxygen may have attributed to fish mortalities.
7. The test observation period was only for 3 days.

B. Statistical Analysis

The data were not clearly presented and incomplete. Analysis was not possible.

C. Results/Discussion

The fish mortalities and reduction of benthic organisms cannot be conclusively attributed to toxicity of naled. Low water levels reduced dissolved oxygen and toxicity from chemical additives (aromatic naptha) may have contributed.

D. Conclusions

1. Category: Supplemental
2. Rationale: Please refer to Test Procedures under Reviewers Evaluation.
3. Repairability: None